IN THIS ISSUE || **FACTS ABOUT MAINTENANCE, from 20 Automobile users.**
THE WINTON MOTOR CARRIAGE DESCRIBED.

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The Automobile

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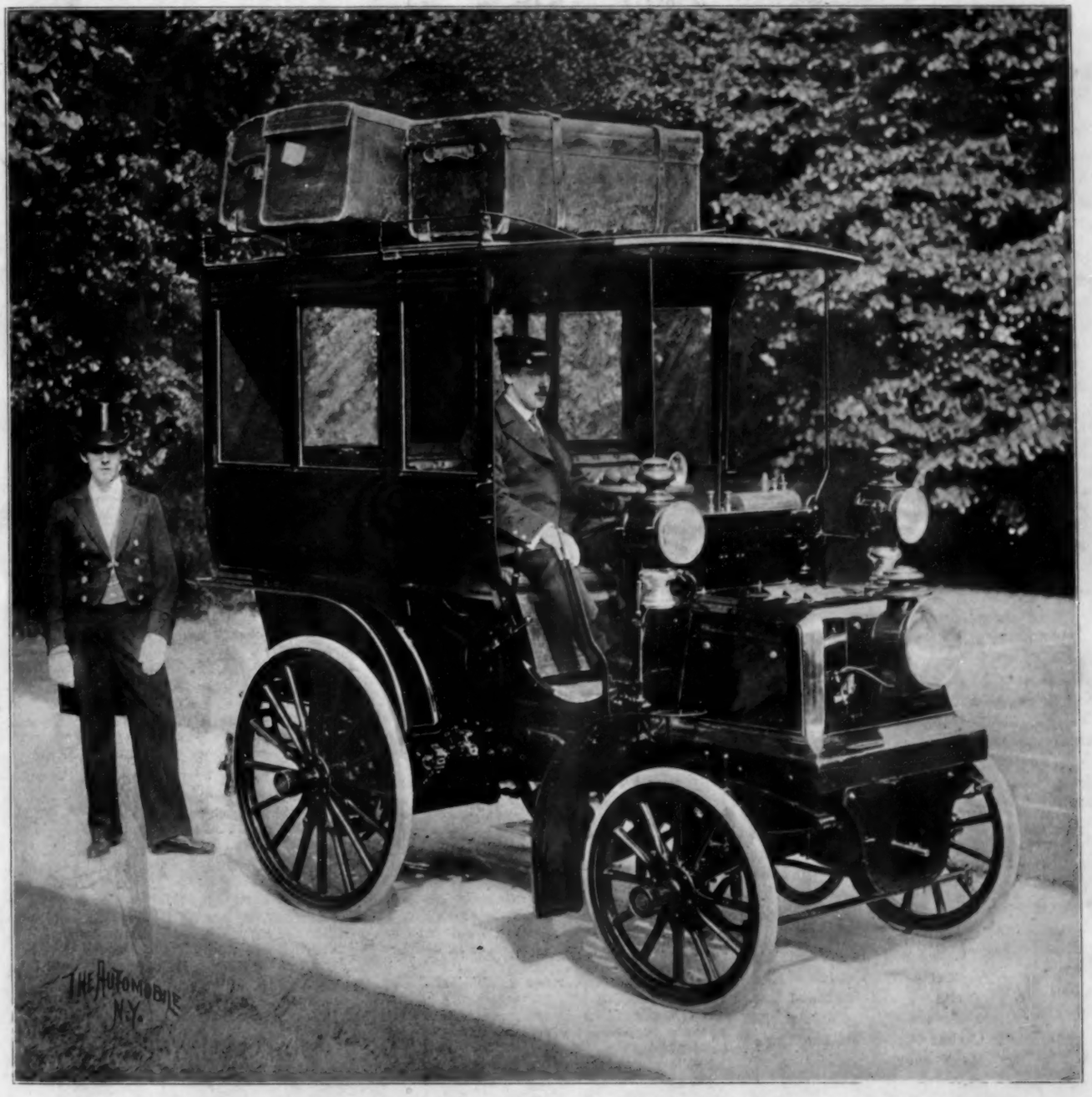


AUTOMOBILE TOURING IN ENGLAND: Alfred C. Harmsworth's 12 horse-power Covered Panhard.

Alfred Harmsworth on the Automobile in England.

The recent visit to New York City of Mr. Alfred Harmsworth, proprietor of the London Daily Mail, Evening News, etc., and one of the best known of English autobobile owners, was naturally an event of interest to automobile owners on this side of the water. To a representative of THE AUTOMOBILE Mr. Harmsworth spoke briefly on the present standing and prospects of the motor car in England.

"The heavy steam wagons in particular," said Mr. Harmsworth, "are progressing very rapidly. They are being taken up for all kinds of heavy traction, and the demand quite exceeds the supply. I use them in my own business, and find them very economical. For sporting and pleasure, too, the use of the motor car is constantly increasing."

In view of the interest taken in the subject of maintenance, Mr. Harmsworth was shown the passages quoted in the January issue of THE AUTOMOBILE from a recent article by Mr. Albert C. Bostwick, and was asked to express an opinion thereon. He replied that he thought the views there expressed decidedly pessimistic. "The light automobile is frequently adopted in the place of a horse or pair in England," he said, "and a gain in economy is the result. I myself have eight machines of all sizes—one American, three French and four English—and I have not experienced the troubles Mr. Bostwick complains of. At the same time, I have three first-class mechanics to look after the cars."

Mr. Harmsworth's automobiles include a 12 h. p. French Panhard for fast work, and the four-passenger English Panhard touring car, also of 12 h. p., which is shown on the front cover of this issue. When asked whether he expected future development in England to be in the direction of higher speed or of greater reliability and lower first cost, he replied that he expected to see improvements in both directions.

"I look for an average speed of 20 miles an hour in the country," he said, "the present legal limit being ten or twelve. Our roads, however, are like asphalt pavements. The immediate outlook in England as to legislation is bad. The public does not understand the automobile and dislikes it. I suppose that much the same is true here. All sorts of absurd things are charged against the machines—that they frighten horses, run over people, etc., and we are having a hard fight to uphold our legal rights. Hostile legislation, however, will cease as soon as people begin to understand the matter."

Asked whether on aesthetic grounds he preferred the American or French styles of design, Mr. Harmsworth conceded the superiority to the former in electric vehicles, but said that for gasoline machines he preferred the French.

Some Facts Regarding the Cost of Maintenance.

In our last issue, THE AUTOMOBILE found occasion to speak of the cost of maintaining and operating automobiles, and it then expressed the opinion that the wide variations between currently reported estimates on this point may be explained, at least in part, by the different demands on them, as to speed, etc., by different users.

As this is a topic of very general public interest, while at the same time trustworthy information on it is exceedingly meagre, THE AUTOMOBILE early in January made an effort to obtain authentic data from users of known impartiality. To this end it addressed the following series of questions to a number of automobile owners in the eastern States:

1. Is your automobile propelled by steam, explosion motor, or electricity?
2. What is its rated horse-power, and what is its weight when ready for the road and with passengers up?
3. What do you estimate the total mileage of the machine to have been since its purchase?
4. What has been your total outlay for repairs and renewals for the above mileage? (Approximate figures will answer.) This does not include alterations which were not necessitated by wear and tear.
5. What is your estimate for depreciation? (Unless the vehicle is used quite regularly, this had better be a function of the mileage rather than of its life in years.)
6. Describe briefly the character of the roads on which most of your driving is done.
7. What is your usual speed: (a) on hard level roads; (b) on the average dirt roads in your vicinity?
8. If you care for your own machine, how much time does it take?
9. If you have an electric carriage, what can you say regarding the repairs and life of the battery?
10. Do you use your carriage for pleasure or for business? In your opinion, is it more or less expensive than the necessary horse or horses, carriage, etc., for the same service? If you have been a horse owner, do you still keep the horses, and if so, why?

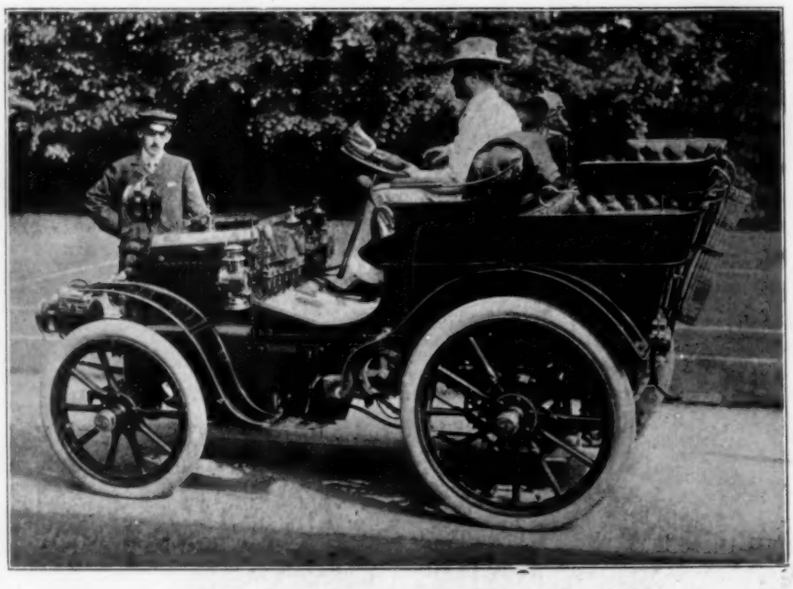
If you have more than one machine, replies in detail for each, so far as possible to give them, would be appreciated.

To these questions the following categorical replies were received, together with several others which are not published only because the answers were not in such detail as to render comparisons possible. In some cases, by permission of the writers, we publish their names and those of their machines.

The following was received from Dr. Truman J. Martin, president of the Buffalo Automobile Club:

1. An electric stanhope built by the Pope Mfg. Co., Mark III., Lot II.
2. 2½ h.p. Weight, 2,250 pounds.
3. 41,000 miles by odometer.
4. About $400 in four years of constant service. One set of Diamond pneumatic tires ran 12,000 miles.
5. Estimate, 10 per cent, although this does not show in the appearance of the machine. It is varnished every three months, and the slightest defect has been given immediate attention.
6. Asphalt, stone, macadam and country dirt roads; the relative mileage on each in the order given.
7. (a) 14 miles on asphalt.
   (b) About 12 miles on dirt roads.
8. For the first three years the vehicle was cared for in my private stable by one coachman in connection with three or four horses. Last year it was kept at a public auto stable.
9. Battery, a Chloride Accumulator, which is cleaned out about every four months. It has depreciated possibly 10 per cent. It was delivered as a 25-mile battery, and it still makes 20 miles on a charge.
10. Used in my general medical practice and for pleasure. Last year I gave up the stable and horses. The electric machine is infinitely less expensive.

TRUMAN J. MARTIN,
Buffalo, N. Y.



ALFRED C. HARMSWORTH IN HIS PANHARD RACER.

Dave H. Morris, of the Board of Governors of the Automobile Club of America, writes:

1. Steam: Locomobile.
2. 4 h.p. Do not know the weight.
3. About 2,000 miles in 6 months.
4. $25.
5. Machine cost $750. I sold it after six months' use for $500.
6. Macadam, fair to good
7. (a) 18 to 25 miles.
   (b) 10 to 15 miles.
8. .....
9. .....
10. No horse could do what I required of my machine. It would kill three of them.

DAVE H. MORRIS, New York.

Another club member writes:

1. Explosion motor: Winton.
2. 9 h.p. 1,600 pounds for carriage without passengers.
3. 1,200 to 1,400 miles.
4. About $50.
5. So far as wear and tear is concerned the carriage seems nearly as good as new, but to sell on the market would cause a sacrifice of 25 per cent.
6. Mostly macadam. The balance good country roads.
7. (a) 15 to 16 miles.
   (b) 12 to 14 miles.
8. Unless to fix a breakdown, it requires but a few minutes' attention outside of washing, installing a new battery, etc.
9. .....
10. It is very much less expensive than a horse. I have been a horse owner for 12 years, but have disposed of the horses as I prefer an automobile on account of its less expense and more pleasure. The above machine is the second Winton I have owned. EDWIN W. ADAMS, New York.

The banner record for a steam carriage is held by Mr. Frank E. Towle, Jr., New York City Surveyor. Mr. Towle's letter is as follows:

1. Steam: Locomobile surrey.
2. 5 h.p. 1,600 pounds.
3. 2,500 miles by cyclometer.
4. $2.50 for spokes, due mainly to insufficient facilities for truing them up, which would throw undue strain on one and thus cause it to break. No other repairs.
5. Would not sell for the price I paid for it—$1,400.
6. Mostly good macadam, but some 500 miles of very bad sand.
7. 12 miles an hour on average good roads. Have many times gone 20 miles in one hour from the stable in several directions.
8. My man washes the machine. I spend 1½ hours per week inspecting engine and running gear.
9. .....
10. For pleasure only. I use horses for business. FRANK E. TOWLE, JR., C. E., New York

The following is from a well-known member of the Long Island Automobile Club:

1. A Haynes-Apperson surrey, old model, with two-cylinder opposed gasoline engine.
2. 7½ h.p. Weight with tanks, etc., full, 1,750 pounds without passengers.
3. 2,000 to 2,500 miles, estimated.
4. An axle broken from an internal flaw was replaced without charge. The value of other new parts—also replaced free—might have reached $1.50. This machine carried its machinery on the underframe direct, which tended to shake things loose, and until I got familiar with it it required a good deal of attention in the barn, though it never interfered with my running day in and day out efficiently and satisfactorily. As a matter of convenience some few repairs which I might have made myself were delegated to a local machinist, whose charges for this work might have reached $20 in eleven months.
5. Hard to tell. The above machine was sold on sight last November without waiting for the best obtainable offer, and was replaced by the new model surrey of same make which was exhibited at the Madison Square Garden Show. This vehicle carries the machinery in the body on springs. It has run some 300 miles absolutely without a hitch, and so far without any attention except oiling. I have not examined a bolt and nothing has worked loose or gone wrong.
6. All on Long Island. Mostly macadam in poor repair, with a good deal of sand, and sandy dust present everywhere.
7. (a) In old machine, 16 miles per hour measured. In new machine, estimated, 25 miles. The new machine made its twelfth mile of actual running in 2:55 on a dirt road before it left the makers. (b) Old machine, from 12 miles up, according to the road. The new machine runs faster.
8. For old machine see answer to question 4. The new machine requires, aside from washing, perhaps half an hour once in two or three weeks, with occasional brief examination of running parts.
10. My one horse is gone. The old machine was about half as expensive and traveled three or four times the distance. I use the vehicle chiefly for calling and short rides, rarely over a dozen miles at a stretch owing to other occupations. I have never been stuck on the road but once, and that was due to the broken axle above referred to. It did not collapse, and the carriage was rolled easily into a nearby blacksmith shop, where we later replaced the axle and ran the machine home on its own power. I use the carriage to take guests to and from station where I would not take the time to hitch a horse. Either machine would carry seven passengers seemingly as easily as four. The new machine has been on some very bad roads, but has always shown more power than was necessary. I have seen many articles in THE AUTOMOBILE and elsewhere in which writers speak of complications and drawbacks of vibration, noise, etc., as inherent in all gasoline machines—drawbacks which have never appeared in mine. I have tried three other makes of gasoline machines and two steam vehicles, and am enthusiastic in my preference for the Haynes-Apperson.

H. S. CHAPIN, Rockville Centre, L. I.

Another Winton owner writes as follows:

1. Explosion motor: Winton.
2. 8 h.p. About 2,150 pounds with passengers.
3. Less than 500 miles.
4. $50.
5. .....
6. Good macadam.
7. (a) Over 20 miles.
   (b) Untried.
8. .....
9. .....
10. I use the carriage for daily trips between house and office. Expense about equals cost of horses, etc. J. C. McCOY, Perth Amboy, N. J.

Four owners of steam carriages prefer their autos to horses, as their letters show:

1. Steam: Locomobile.
2. 4 h.p. Weight 825 pounds with tanks filled; with passengers, about 300 pounds more.
3. Over 2,000 miles.
4. About $20.
5. Too small to figure.
6. Generally good, but with pronounced grades.
7. (a) 15 to 20.
   (b) 6 to 15 miles an hour.
8. Average three-fourths of an hour to make ready each time the carriage goes out. Three hours a week spent in cleaning.
9. .....
10. For pleasure. Less expensive than horse. FRANK W. BOLANDE, Bridgeport, Conn.

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1. Steam: Locomobile.
2. 4 h.p. 850 pounds with passengers.
3. 2,000 miles.
4. Almost exactly $70.
5. I consider my machine has depreciated 33 per cent in value since its purchase in August, 1899.
6. 1,000 miles through New England, country roads. 1,000 miles on city streets.
7. (a) 15 to 25 miles an hour.
   (b) 8 to 15 miles an hour.
8. I do nearly all the work on my own machine. On my country tour I averaged an hour a day at it.
9. .....
10. For pleasure. Less expensive than a horse. I have owned horses all my life until a year ago. The auto is so much superior to the horse in every way that I no longer think of the animal.

F. P. AVERY, Captain U. S. A., Washington, D. C.

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1. Steam: Locomobile.
2. 4 h.p. Weight with tanks full, and passengers, 900 pounds.
3. 4,000 miles.
4. $50.
5. $100 per year.
6. Good macadam around Boston, and on special trips very bad roads in northern Connecticut and western Massachusetts.
7. (a) 18 miles per hour.
   (b) 14 miles per hour.
8. 15 minutes to start if tanks are empty; 5 minutes to put up machine; 45 minutes to clean.
9. .....
10. For pleasure. It is very much cheaper than horses. HENRY HOWARD, Brookline, Mass.

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1. Steam: Mobile.
2. 4 h.p. Estimated weight 800 pounds.
3. 1,500 miles.
4. Two new tires on rear wheels. No other repairs of consequence.
5. The carriage seems as good in every way as when new.
6. Hard roads; asphalt and macadam.
7. (a) 12 miles an hour.
   (b) Untried.
8. From half an hour a day when in use.
9. .....
10. For pleasure: far less expensive. I formerly owned horses, but do not now.

CHARLES R. OTIS, Yonkers, N. Y.

A Brooklyn and a New York man have had experiences respectively as follows:

1. Steam.
2. 4 h.p. Weight 800 pounds without passengers.
3. About 5,000 miles.
4. About $30.
5. .....
6. Macadam as a rule.
7. (a) From 12 to 18 miles per hour.
   (b) 8 to 12 miles.
8. About 30 minutes per day.
9. .....
10. I have been a horse owner and consider I get double the pleasure from the automobile here in the city. The steam carriage, however, will not travel the rough roads the horse will.

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1. Steam.
2. 4 h.p.
3. 600 miles.
4. $45.
5. 25 per cent. per year.
6. Good macadam and asphalt.
7. 8 to 14 miles on above roads.
8. One hour each time I go out.
9. .....
10. For both pleasure and business. Cheaper than horses. I keep horses for pleasure and variety.

Another New York man is in a position to compare the steam and gasoline systems, which he does with the following results:

1. 2 carriages—a steam runabout and gasoline touring carriage.

2. Steam: 4 h.p.; 800 or 900 pounds without passengers. Gasoline: 10 h.p.; 3,000 pounds (?)*
3. Steam: 700 miles. Gasoline: 400 miles.
4. I do not know, as I had several accidents, such as the boiler burning out owing to the pump failing to work.
5. The steam carriage depreciates rapidly. The gasoline machine runs better than when new.
6. Macadam and dirt roads.
7. (a) 18 miles an hour.
   (b) 15 miles an hour.
8. .....
9. .....
10. For pleasure. Barring accidents, the automobiles are less expensive than horses. I still use horses for general purposes.

Two New York owners of electric carriages report as follows:

1. Electricity: Riker stanhope and Riker brougham.
2. Stanhope: 3½ h.p.; 3,100 pounds. Brougham 6 h.p.; 4,400 pounds.
3. 500 and 300 miles respectively.
4. $5.
5. Used constantly 10 miles per day. Depreciation 10 per cent per year, plus another 10 per cent for obsolescence.
6. Asphalt pavement.
7. 8 to 12 miles.
8. Employ a young driver, who does the washing, etc., and experienced mechanician four hours per week as inspector.
9. Not long enough in use for test.
10. For pleasure. Costs less than horses.

SCHUYLER S. WHEELER, New York.

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1. Electricity.
2. 2½ h.p.
3. 1,200 miles.
4. $15.
5. 20 per cent per year.
6. Good macadam and asphalt.
7. 8 to 10 miles on above roads.
8. One-half hour a day.
9. Estimated at 20 per cent depreciation per year.
10. (a) Both. (b) Cheaper than horses. (c) Yes, for pleasure.

A third, who believes in the electric vehicle, expresses himself thus vigorously on the subject of existing storage stations:

The only trouble I have experienced with my storage battery brougham is the dense ignorance, stupidity, and incompetence of those who have charge of the station where it is kept. A graven image could not stand such a neglect; while high prices are charged and willingly paid for the service. Until better stations can be found where the machines will be properly cared for, the use of storage battery vehicles must be restricted to those who use them only for amusement.

One writer from New York and two from Providence, R. I., have found their machines pretty expensive. The following respectively are their reports:

1. Steam.
2. 4 h.p. About 1,000 pounds with passengers.
3. 2,000 miles.
4. $350.
5. 15 to 20 per cent per thousand miles.
6. Tar, macadam and dirt.
7. (a) 22 to 25 miles.
   (b) 12 to 15 miles.
8. One hour a day.
9. .....
10. For pleasure. More expensive than a horse. I still keep a horse.

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1. I have a steam carriage and a gasoline touring machine.
2. Steam: About 5 h.p. Gasoline: 8 h.p.
3. Steam: 1,000 miles. Gasoline: 1,500 miles.
4. Steam: $250. Gasoline: $350.
5. Steam cost $850; worth now $750. Gasoline machine cost $1,200, and consider it worth now $900.
6. Average good country roads.
7. (a) 16 to 18 miles.
   (b) 8 to 10 miles.
8. A great deal; at least an hour after each run.
9. .....
10. For pleasure. Cost about the same as a good horse and proper outfit.

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1. Steam.
2. 4 h.p. 1,000 pounds with tanks full, but without passengers.
3. 1,200 miles.
4. $100.
5. 20 per cent per year.
6. Block pavement and macadam.
7. (a) 12 miles an hour.
   (b) 10 miles.
8. I employ an operator and caretaker.
9. .....
10. Expense about the same as that of a horse.

Although the last two writers consider their repair bills no more than equal to the cost of a good horse and outfit, a Bridgeport correspondent thinks differently:

1. Steam.
2. 5 h.p. 1,000 pounds with passengers.
3. Between 1,000 and 2,000 miles.
4. $250.
5. Cost $700 new; repairs $250; am selling at $450.
6. Macadam and country roads.
7. (a) About 18 miles per hour.
   (b) 12 miles per hour.
8. .....
9. .....
10. For pleasure. More expensive by far than horses. I still keep my horse, as I love horses.

This individual — who diplomatically forgot to sign his name—annotated the last paragraph of the list, after question 10, with the feeling remark, "Only one, thank God!"—for which one can hardly blame him, after his experience.

Very diverse as are these replies, in respect of both outlay and the personal impression of the owners regarding their machines, the main fact is well established by them, namely, that in its present stage of development it is possible, with intelligent handling, for the automobile to take the place of the horse as an instrument of recreation, and to do this, nearly always at a lower cost per mile, and in many cases at a lower outlay even for a yearly mileage two or three times that possible with a horse. The especial value of the figures lies in the fact that with but two or three exceptions all the letters are from strictly private owners. So far as is known to the Editors, only one of the correspondents—the owner of an electric vehicle—is in any way interested in the manufacture or sale of the make of vehicle owned by him. We believe that, taken as a whole, the foregoing reports comprise a body of evidence as trustworthy and unprejudiced as it would be possible to obtain within the same compass. THE EDITORS.

*We believe the real weight of the machine referred to is about 2,000 lbs. without passengers. —Ed.

To Permit the Transport of Automobiles on Ferryboats.

On January 7 the following bill was introduced in the United States Senate by Senator Platt, of New York: "A bill to amend Section 4472 of the Revised Statutes of the United States so as to permit steamboats to carry automobiles using gasoline as a method of propulsion. Be it enacted, by the Senate and House of Representatives of the United States of America, in Congress assembled, that Section 4472 of the Revised Statutes be amended by adding thereto, at the end of said section, the following:

Nothing in the foregoing or following sections of this act shall prohibit the transportation by steam vessels of gasoline or any of the products of petroleum when carried by motor vehicles (commonly known as automobiles) using the same as a source of motive power; provided, however, that all fire, if any, in such vehicles or automobiles be extinguished before entering the said vessels, and that the same be not relighted until after said vehicle shall have left the same.

The same bill was introduced on January 17 in the House of Representatives by Mr. Fitzgerald, of New York, and was referred to the Committee on Interstate and Foreign Commerce. The Senate bill was referred to the Committee on Commerce, and reported favorably on January 17, with the following amendment added to it: "Provided, further, that any owner, master, agent or other person having charge of passenger steam vessels shall have the right to refuse to transport automobile vehicles, the tanks of which contain gasoline, naphtha or other dangerous burning fluids."

Automobiles at the New York Cycle Show.

A few automobiles and a number of motocycles were exhibited at the Cycle Show, Madison Square Garden, Jan. 12 to 19. The Mobile Co. of America had a number of standard carriages, and the Spalding-Bidwell Co. also showed several Mobiles. The American Bicycle Co. showed a Toledo steam carriage, Rambler and Trimoto gasoline machines, several Waverley electrics, and a Cleveland motor tricycle.

Two recent additions in the automobile line were a light gasoline runabout, with De Dion motor, made by a successor to the late Warwick Cycle Co. of Worcester, Mass., and an electric runabout made in Chicago, shown by the Boston Motor Carriage Co. Other machines were a Grout Bros. steam carriage, and a gasoline runabout by the Loomis Automobile Co. of Westfield, Mass. The Manhattan Automobile & Storage Co. showed an electric runabout and a motor bicycle, which they call the "Stratton."

The E. R. Thomas Co., of Buffalo, had the best exhibit of motocycles, this including samples of the "Autobi," "Autotri," and "Autotwo." A late arrival was the Holley "Autobike," which attracted much notice.

The Winton Motor Carriage.

By Herbert L. Towle.

Although the Winton gasoline carriage is one of the best known of American machines, so little in the way of description of it has appeared in print that with the appearance of the 1901 model it seems not inappropriate to give a somewhat detailed description of the improved machine.

The half-tone, Fig. 1, shows a front view of the carriage, and Fig. 2 is a rear view of the machinery, with screen and back panel of the body removed. For convenient reference the writer has sketched the engine, transmission gearing, and water tank in their respective positions on the frame in Fig. 3. The transmission gears are not essentially different in the 1901 model from formerly, except that they are encloced in a light phosphor bronze case. The sprocket pinion is loose on the main shaft, and drives direct to a large sprocket on the differential drum of the rear axle. A gear, c, is fast with the sprocket wheel, and next to that is a friction disc d, carried on a feather on the shaft. Attached to the fly-wheel is a friction disc, a, against which bears another disc b, attached to the sprocket pinion. Normally the two sets of friction surfaces, at a b and c d, are loose, but when the thimble e is thrust in, the toes of the two clutch dogs press against d, and bind all the friction surfaces together. In this condition the sprocket pinion turns with the main shaft, and this gives the high speed forward. Adjustment for wear is by screwing the carrier, m, forward on the shaft.

The low speed forward is obtained by releasing the clutch e, and gripping the gear i, which is normally loose, to its shaft, by the clutch shown. Then the transmission is via the gears f, i and h, to gear c. The reverse is by means of gears g and j, through an intermediate pinion beneath them. These various gears, and also a brake on l, are operated by the two levers, the longer of which operates clutch e in its backward motion, and the brake in its forward motion, while the other operates the two clutches on the countershaft. For emergencies there is a new double-acting brake on the differential drum. This is of the form sketched in Fig. 4, and it has cast iron rubbing jaws on a phosphor bronze drum. It is powerful enough to slide the wheels.

Two adjustable distance rods are supplied, one on each side just outside the body. The underframe is in the form of an isosceles triangle with its vertex at the center of the front axle and a central member from the vertex back to the center of the rear axle. The vertex ends in a threaded adjustment, passing horizontally through the front axle, with nuts at front and back, it being necessary to adjust these with the distance rods when the chain is tightened. Longitudinal elliptic springs at each end of the front axle, with no distance rods to the body, allow the front wheels to yield somewhat when striking abstacles, thus avoiding excessive strains.

The main frame of the machine, on which all the weight above the axles is carried, is of seasoned oak bars, 1½x3 inches, joined together by steel angles. This gives a desirable resiliency to the structure, while binding of the transmission gear bearings is prevented by the closeness of the shafts. The front transverse bar of the frame is just forward of the transmission gear, the rear bar being at the extreme back. The cylinder head of the engine and the back of the water tank are supported by an elastic cross piece, consisting of a light oak strip riveted between two plates of spring steel. This cross piece is attached to the springs at its outer ends, and is bolted to the oak frame, with blocks a few inches high interposed. This gives an elastic and yet very strong support both for the body and for the engine and tanks. Flat iron strips, about ⅛ inch thick, are riveted to the under side of the main frame, and serve partly to stiffen it and partly as a continuous washer for the various bolts, etc., passing through.

FIG. 1. THE WINTON MOTOR CARRIAGE.

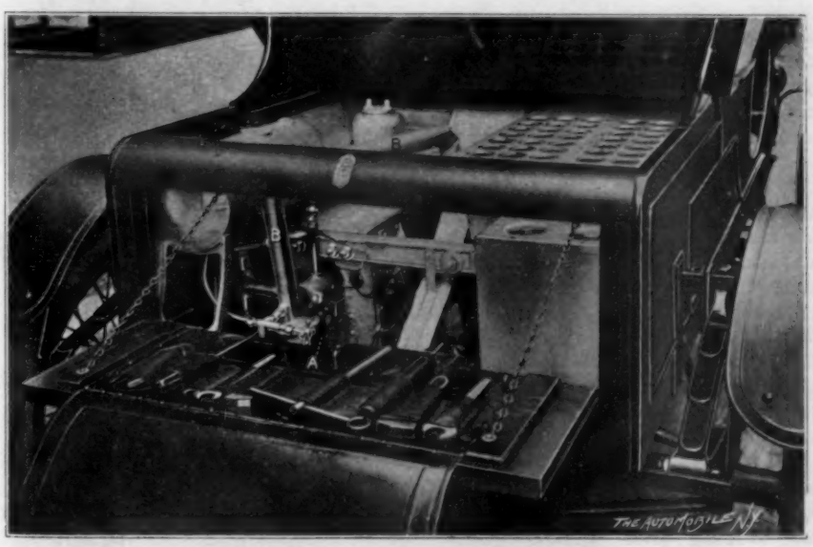

FIG. 2. THE MOTOR AND TANKS EXPOSED.

The pneumatic system of control of the Winton engine is now familiar. Its principle was described in the article on "The Gasoline Vehicle Engine," by E. W. Roberts, in THE AUTOMOBILE of last December. The air pump, at the left of the engine, is worked by an eccentric on the engine shaft. This eccentric is located 180 degrees from the cranks, and the pump plunger carries a bob weight (not shown in Fig. 3) intended to balance so far as possible the inertia of the piston.

Instead of a vaporizer, the Winton machine uses a carbureter similar in principle to those frequently used on launch engines. This carbureter, marked A in Fig. 2, is filled with gauze, and the gasoline enters it from above through a valve controlled by a needle point on the end

of the inlet valve stem. Before entering the carbureter by the pipe B, the air passes through an annular chamber around the muffler, which in the new model is smaller and less conspicuous than in the old. In the carbureter the warm air takes up the gasoline in passing through the gauze, and enters the engine as a perfect mixture. As the lift of the inlet valve is controlled according to the speed, the amount of gasoline allowed to pass through the needle valve is correspondingly regulated, so that the quality of the mixture is nearly uniform. The ignition is by make and break, with a snap cam.

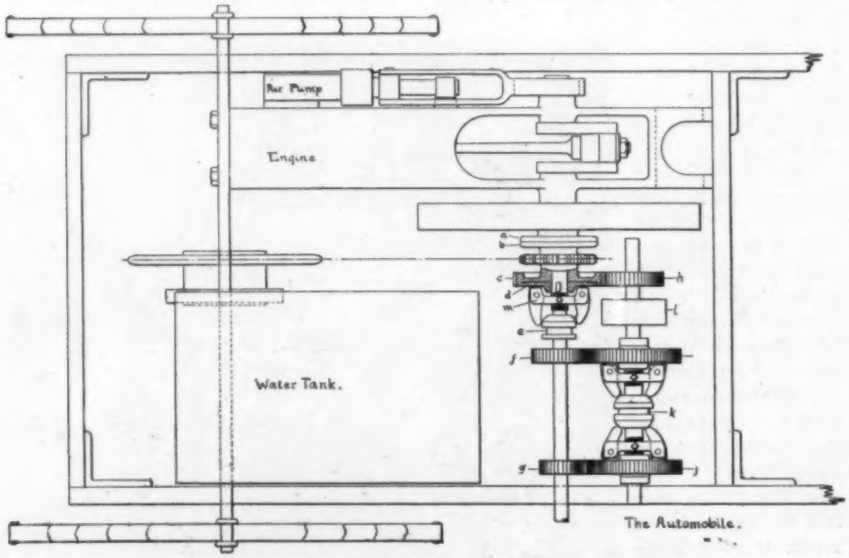

FIG. 3. PLAN OF WINTON MOTOR AND TRANSMISSION.

In the place of the natural circulation formerly relied on, the new model is fitted with a centrifugal circulating pump. As the transmission gear is encased, the matter of lubrication is materially simplified, a single oil cup with branch pipes feeding all the bearings of the engine and air pump. A further improvement is a splash guard over the crank case, which is open above as heretofore. All the oil from the engine bearings runs into the crank case, from which it can be drained off by a pet cock. The cylinder oil cup on top of the engine is retained as before.

An important improvement in the 1901 model is the substitution of wheel steering, through an irreversible worm gear, for the tiller steering formerly used; and another change is in making all wheels and tires the same size. The motor is more powerful than heretofore, and the gasoline tank has been enlarged to hold 8 gallons—sufficient, it is claimed, for a 150-mile run.

The author acknowledges his indebtedness to the Winton Motor Carriage Co., and to Mr. Percy Owen, the New York agent, for courtesies in connection with the preparation of the above article.

The Milwaukee Steam Truck.

The steam truck shown in the accompanying illustrations has just been completed by the Milwaukee Automobile Co. from the designs of W. L. Bodman, formerly with Simpson & Bodman, Manchester, England. It is intended for a load of 4,000 pounds, this being considered by its designer the maximum which can be efficiently handled by motor trucks under American conditions of climate and road surface.

It was originally intended to equip this machine with a flash boiler of the Simpson & Bodman type, but, owing to the impossibility of obtaining the right tubing in time, a fire-tube boiler of the usual American type, with 150 square feet of heating surface, was substituted. The working pressure is 225 pounds, and the fuel is kerosene, burned in two single-nozzle vaporizing burners. This boiler is considered by the company something of an experiment in this application, and its performance will be awaited with interest.

The principal framing of the truck, including all parts liable to excessive twist or working chiefly in compression, is of seasoned oak, in the superiority of which over metal for this purpose the company is a firm believer. The reaches are of oak, and likewise the radius bars, which sustain the pull of the chain. The rear axle is of the divided type, with a through tube inside the driving sleeves which connect the differential gears with the wheels. An innovation is the use of four rear springs, which distribute the load and also relieve the axle of the bending force incident to the ordinary arrangement. Plain bearings are used throughout.

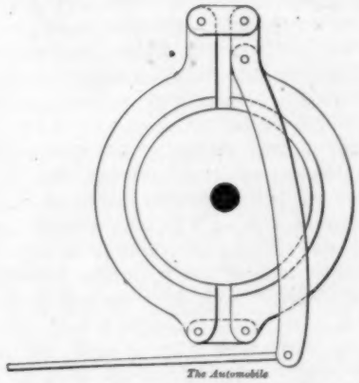

FIG. 4. HOW THE EMERGENCY BRAKE WORKS.

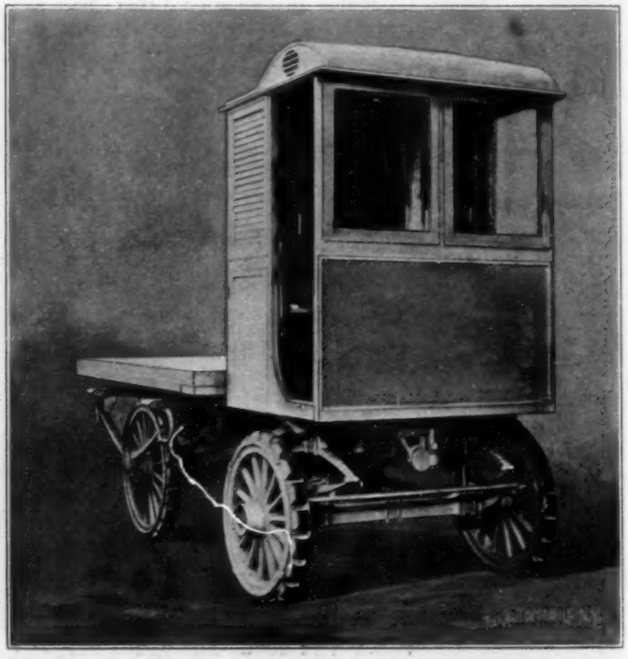

FIG. 1. THE MILWAUKEE STEAM TRUCK.

The engine has three vertical single-acting cylinders, with cam-lifted popper valves. The cut-off is varied by shifting the cam shaft—the standard arrangement for engines using superheated steam, such as a flash boiler gives. There are two sets of speed gears, giving four and ten miles respectively, the changes being made by a clutch. The regular brake acts

on the differential drum, and a pair of emergency screw brakes may be applied to the rear tires. The water tanks, containing 70 gallons, are directly over the rear axle, and the oil tank (not shown) is at the extreme rear, giving a weight of practically 1,000 pounds for traction when unloaded.

Owing to the severity of Western winter weather, the cab is enclosed, but it can be opened freely in the summer.

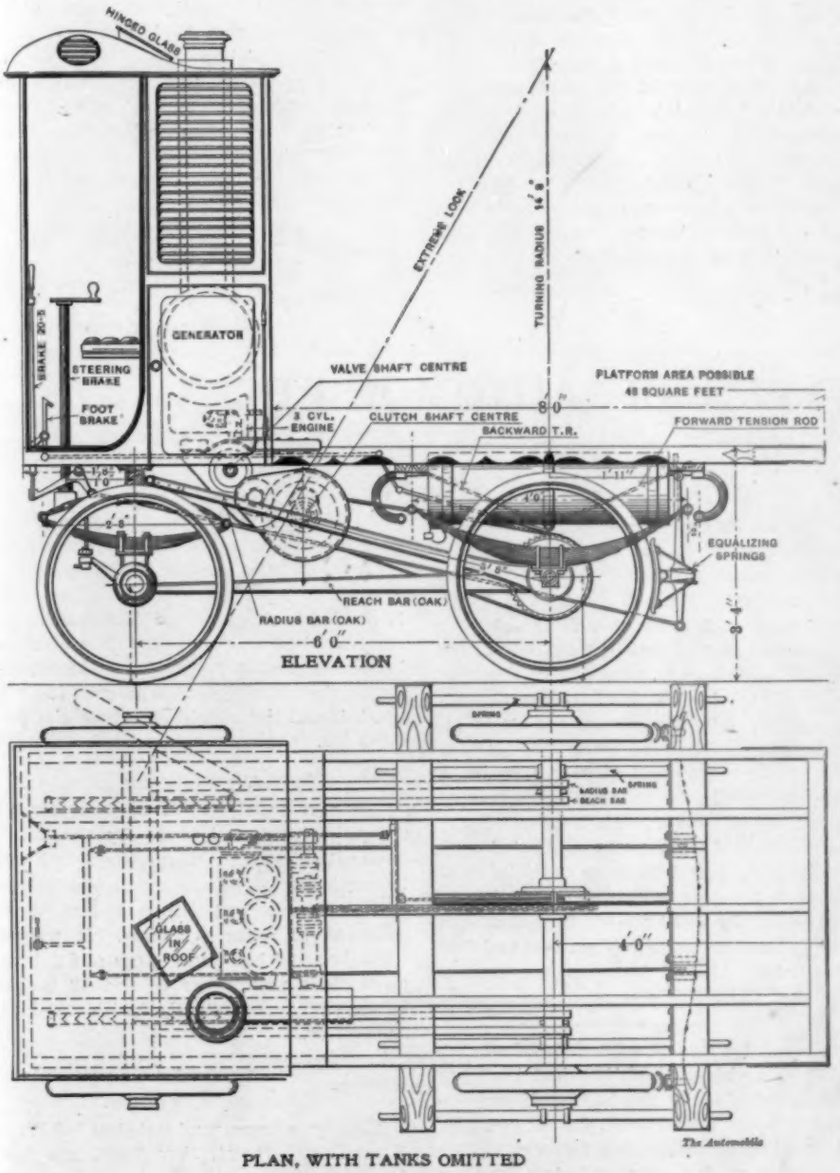

FIG. 2. THE MILWAUKEE STEAM TRUCK.

A runaway on the Brooklyn Speedway, on Jan. 27, stampeded half-a-dozen horses. Expensive rigs were smashed and drivers and officers thrown before the animals were subdued. Could a better object-lesson in the safety of the automobile be found?

The Gasoline Vehicle Engine.

VIII.

By E. W. Roberts, M. E.

The subject of balancing a gasoline engine, especially when it is to be employed for motor vehicles, has been given much study by designers. In a single-cylinder engine the engine is usually balanced by some sort of rotating weight, as illustrated at w in Fig. 17. The purpose of this weight is to counteract the swinging action of the piston p, the connecting-rod c, the crank-arm a, and the crank-pin k. As the position of the crank-arms and the crank-pin relative to that of the counter-weight is always the same, it is possible to balance their action perfectly. But the preponderance of weight is in the piston and the connecting-rod, the position of which with relation to the counterweight is continually changing throughout a revolution of the crankshaft. Therefore the actual demand upon the counterbalance is constantly changing.

This constant variation in the effect of the moving parts makes it necessary to make some compromise in adjusting the weight so that it will give the best effect. If it were designed to balance only those parts considered as rotating, it would be insufficient and the engine would be underbalanced; while were it designed to balance all the moving parts which operate upon the crank-pin, the engine would be overbalanced. In designing an engine, it is customary with many engineers to balance all that portion of the weight to be considered as rotating and one-half

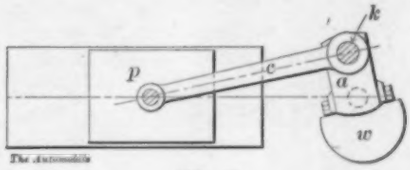

FIG. 17.

that to be considered as reciprocating (moving to and fro). The crank-pin and the crank-arm, together with five-eighths of the weight of the connecting-rod, are usually classed as the rotating portions, and the rest of the rod and the piston are considered the reciprocating portions.

In order to enable any reader to fit counter-balances on his engine in case he is not satisfied with those already in use, or in case he is building a new engine, the writer will explain briefly how to calculate the weight. First, weigh the finished piston and the finished rod, as it is difficult to calculate accurately the weight from the dimensions. Then calculate the weight of the two crank-arms and the crank-pin from the finished dimensions. Add together one-half the weight of the piston, thirteen-sixteenths the weight of the rod, and the weight of the crank-pin, and multiply this result by one-half the stroke of the engine. To this product add the product of the weight of both crank-arms by the distance of the center of gravity of the arms from the center of the crankshaft. The sum of the two products divided by the distance of the center of gravity of the counterweight from the center of the shaft is the proper weight for the balance. The writer realizes that this rule may be somewhat confusing to the average reader, but it is nevertheless given for the benefit of others, and any one may make use of it with the assistance of a technical friend.

It will be seen that the further the weight is from the center of the shaft the smaller it may be made, and for this reason, and also because it is more convenient to attach it there, the weight is often placed in the flywheel rim. This form of construction is not, however, conducive of good results, as it places an extra strain upon the crankshaft, and unless

the latter is made very stiff, the flywheel will soon be found to be running out of true in a sidewise direction.

In order to obtain a better mechanical balance with a single-cylinder engine, some builders attach a circulating pump to the side of the engine cylinder, making the pump single acting, and the weights of its piston and connecting-rod equal or nearly equal to those in the engine itself. The crank-pin of the pump is placed opposite or 180° from that of the engine, and the balance thus obtained appears to be an improvement upon the revolving weight.

Nothing that the writer is at present aware of has been accomplished in balancing the shock of the explosion in an engine with one cylinder. Builders of vertical engines claim that this shock is practically all taken up by the cushioning action of the springs or the tires, and that with a single-cylinder vertical engine there is little or no vibration when the engine is running and the carriage is standing idle. The writer does not care to enter a controversy on this point, and he will leave the builders of the respective types to settle it among themselves.

Action on the Show Question.

On Dec. 10 the executive committee of the National Association of Automobile Manufacturers passed a resolution recommending, in view of the numerous automobile shows projected throughout the country, and the coercive methods adopted to induce manufacturers to exhibit, that the members of the association should refrain from agreeing to exhibit at any proposed show until it had been sanctioned by the association.

At another meeting, on Jan. 2, resolutions were adopted discountenancing any show in Chicago except under the auspices of the Chicago Automobile Club, and recommending that, owing to the fact of the Pan-American Exhibition occurring in May, the Chicago club defer its exhibition until next year. Some protests, however, were received by the promoters of shows set on foot before the formation of the association, and a subsequent meeting was held on Jan. 18, at which the previous action of the committee was rescinded and the Association declared absolutely neutral as to shows which had been announced prior to Nov. 10, 1900, while all other shows, except an annual show in New York and one in Chicago, under the auspices of the respective clubs, and the Pan-American Exhibition, were discountenanced.

NEW STYLES OF AUTOMOBILES

The Conrad Steam Runabout.

The Conrad Motor Carriage Co., of Buffalo, N. Y., makers of running gears and frame fittings, build the steam runabout shown on the opposite page.

The Orient Gasoline Runabout.

This neat-looking vehicle was first exhibited at the Madison Square Garden show, New York, last November. Its running gear is similar to that of the "Victoriette," made by the same company, and includes a water-cooled Aster motor of 3 or 5 h. p., with circulating pump, two forward speeds and a reverse, etc. Steering is by rack and pinion, the steering handle making several turns from hard over to hard over. The speed changes are by sliding gears, a short lever on the steering column shifting them. Instead of interposing a clutch between the motor and transmission gear, this connection is solid, while a cone clutch is contained inside the brake drum on the differential. When this clutch is disconnected the rear sprocket runs free, and this enables the gear to be shifted without shock. Handles for controlling the ignition lead and carburation are on the steering column.

A feature of the machine is its underframe, which is jointed in the middle and hung from the body at that point, so that its middle moves up and down with the springing of the body. The motor and transmission gear, instead of being in the body, are mounted on this underframe, where they get the benefit of the spring support of the body, while at the same time distance rods to the rear axle are unnecessary. The Waltham Mfg. Co., Waltham, Mass., are the manufacturers.

The Eclipse Automobile.

The steam carriage shown on the opposite page is one of the regular design made by the Eclipse Automobile Co., of South Boston, Mass. It has a novel water-tube boiler of their own design, with a compound engine rated at ten horsepower. The burner is arranged to do away with the torch. The pilot light is lit with a match, while the burner proper is divided into halves and is controlled from the seat so that one-half or the whole of the burner can be used. Ten gallons of gasoline are carried, and the air pressure is maintained by a pump connected with the engine, thus dispensing with the hand pump. The rear wheels are 30 inches in diameter, the front wheels 28 inches, and the compensating gear is encased and free from dust. Roller bearings are used in the rear axle.

The Kidder Steam Carriage

This machine, which has just been put on the market by the Kidder Motor Vehicle Co., of New Haven, Conn., contains a number of distinctive features. The engine comprises two cylinders, one on each side of the boiler, and these work through long connecting rods on two cranks at the ends of a countershaft directly over the rear axle. The differential drum carries a spur gear instead of a sprocket wheel, and this meshes with a pinion keyed on the middle of the countershaft. There is, therefore, no sprocket chain to stretch or break. The engine, boiler, tanks, etc., are carried on a tubular frame in the body, and ball joints at the connecting rod ends allow for motion of the body on its springs. The exhaust steam passes first through a feed-water heater and thence to an air condenser under the footboard. The air pressure is maintained by a small air pump constantly working, and any excess of pressure escapes by a safety-valve. The fuel tank is carried in front of the dashboard. To start the burner a few spoonfuls of alcohol are burned in a pan under the vaporizing tubes. Seven gallons of gasoline are carried, and the weight of the carriage is 1,000 lbs.

The Riker Electric Brougham.

The private electric brougham shown on the next page is built by the Riker Motor Vehicle Co., Elizabethport, N. J. It carries two passengers and a driver and footman, and has a radius of 25 miles at 12 miles per hour. It weighs 3,500 lbs., and has two motors of 2¼ h. p. each. The wheels are 36 and 42 inches in diameter respectively, with 2½-inch solid tires.

The Auto-Dynamic Company's Delivery Wagon.

The above company, located at 140 West Thirty-ninth street, New York, has just brought out the electric delivery wagon shown on the next page, which embodies several novel features. Chief of these is the placing of the motors in the fore part of the body, where they get the benefit of the spring suspension in common with the batteries. This, at moderate speeds, obviates the necessity for an elastic tire, and the tire used by the company, while not elastic, is claimed to possess exceptional non-slipping qualities.

The storage battery is hung below the body, the low center of gravity permitting the use of a short wheel base. Exceptional capacity is claimed for the battery.

FIG. 1. CONRAD STEAM RUNABOUT.

FIG. 2. ORIENT GASOLINE RUNABOUT.

FIG. 3. ECLIPSE STEAM CARRIAGE.

FIG. 4. KIDDER STEAM CARRIAGE.

FIG. 5. RIKER ELECTRIC BROUGHAM.

FIG. 6. AUTO-DYNAMIC DELIVERY WAGON.

NEW STYLES OF AUTOMOBILES.

The Automobile

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CONTENTS.

We publish this month the second of a series of articles on the leading American and foreign automobiles. It is the intention of the publishers to make this series a special feature of THE AUTOMOBILE during 1901, and to give its readers therein the most complete possible presentment of modern ideas in automobile design. The articles will be fully illustrated, will cover the three recognized systems of motive power, and will be written with a thoroughness and freedom from bias that will make them second to none in the field they cover.

Light on a Vital Subject.

We feel justified in inviting particular attention of our readers to the twenty reports from automobile users, published on another page, on account of the exceptional value of the information given therein regarding the actual maintenance cost of automobiles. Many statistics have before appeared in print which seemed to demonstrate beyond a cavil that this cost was but a bagatelle compared with the keep of a horse. Unfortunately, most of these rose-tinted pictures have emanated from persons financially interested in their vindication; and this fact, coupled with the somewhat striking discrepancy between the modest percentage marked off in the professional estimates for repairs and depreciation, and the complicated series of breakdowns which is popularly believed to be the chief theme of conversation where the motorists gather together, has served to deter from actual purchase many people who, being able to afford a horse, would much prefer the speedier motor were they but assured that they were not exchanging the gallant steed for a "pig in a poke."

It is not difficult to estimate the fuel consumption on a given mileage; and even at the worst the outlay for this item is very moderate. The interest account of an automobile is materially greater than that for a horse; but on the other hand it costs next to nothing to stable, is not a consumer of supplies when inactive, and will accomplish as much work as two or three horses. The determining factor, about which there is still much uncertainty, is that of repairs and depreciation. Once let it be known that the motor vehicle is not intrinsically subject to costly breakdowns, and its adoption by every horse owner who, as a boy, was moved to dissect his bicycle or his Waterbury watch, because *ipso facto* inevitable. That this condition is already at hand the figures published in this issue go far to show, and every year marks a further advance in the direction of simplicity and reliability. It is a noteworthy fact that, of all the letters received, only one indicates that its sender is disappointed in his machine or disposed to compare it unfavorably with the horse. It would be hard to find more convincing testimony to the efficiency of the motor carriage.

In behalf of its readers, THE AUTOMOBILE extends its thanks to the correspondents who have so kindly contributed their experience for the public benefit.

Not an Unmixed Evil.

The multiplication of automobile depots in New York City, while it may diminish immediate dividends to the vanishing point, cannot but have a wholesome effect on the quality of service rendered to customers. Unfortunately, the correspondent in this issue who declares that their inefficiency in this regard is the main obstacle to the urban use of electric carriages, is not alone in his opinion. The competition now springing up will undoubtedly correct this evil very soon.

The Sources of Efficiency.

It was the Editors' wish in obtaining the reports from users, published elsewhere in this issue, to compare so far as possible the working conditions with the repair bills, and to facilitate this the maker's name was obtained in every case. The electric vehicles reported are all of different manufacture, and no inferences are therefore possible as to the effect of roads and speed on the wear and tear. It is noteworthy, however, that all the reports so far as they go speak well for these machines, and that of Dr. Martin is exceptionally striking. Both of the other electric vehicle users are men well acquainted with the needs of their machines, and the question of proper care, to which these machines are sensitive, does not arise.

Coming to the steam machines, the two best-known makes may be grouped together. The carriages with a large repair bill show a slightly higher speed average than the others, possibly 25 per cent.; and the average quality of the roads is quite sensibly lower, in the same connection. There is a long jump, however, between a repair bill of $2.50 in 2,000 miles and $350 in the same distance; and, if we assume equal care in workmanship, the conclusion is inevitable that the amount of attention given to these machines has a most important effect on their performance and life. This is necessarily true of any motor carriage, but it is more particularly true of the steam vehicles, because with the majority of them the boiler feed is not regulated automatically and needs constant watching. We have heard of an experienced operator burning out four boilers in four days; while on the other hand the remarkable record that may be made by the use of proper care is attested in the majority of replies received.

Three of the five gasoline machines reported are of one make, and the disparity between the best and worst reports here is nearly as striking as with the steam vehicles. The influence of the roads is apparent in this case, but it is far from sufficient to explain the whole story. The gasoline machine needs perhaps greater intellectual acumen, to master its subtle details of vaporizer and igniter, than the steam carriage calls for; but when in order it needs less constant watching, and the difference in the reports can only be explained on the supposition of greater or less mechanical aptitude or a difference in workmanship. It is certain that the need, not necessarily of a shop or technical education, but of the native mechanical sense that moves its owner to compassion on his automobile when it struggles in a rut or groans with a cramped bearing or badly-adjusted clutch, cannot be too often insisted on.

Much the largest part of the aggregate mileage reported was made on at least fairly good roads. It is to be hoped that some day there will be no other roads which automobilists will be forced to travel; but meanwhile a specific report of endurance on uniformly bad roads would be a welcome addition to the testimony here published.

Haste that is Suicidal.

It is deplorable but too true that there are manufacturers of automobiles to-day whose sole object seems to be to turn out their machines as fast as possible, without regard to the subsequent showing made by these machines on the road. A long waiting list is the easiest of excuses for this, but that does not make such slighted work less suicidal. A member of the Automobile Club of America, who in this connection shall be nameless, has operated within the last two years two machines of a well-known make, and he recently informed us that he would sooner have had the first machine back again than to have had the second as a gift. In design the second machine was an improvement over the first; but it was built ahead of a considerable waiting list, and the result showed itself in "scamped" workmanship and absolutely reckless assembling. Some manufacturers who at one time showed a disposition to yield to this sort of temptation are mending their ways, and the general average of American automobiles is notably better this year than last; but the temptation is present everywhere, and to yield to it spells disaster.

What manufacturer, for example, can afford to have his product make such a record in the hands of its users as the machine described in our correspondence column in this issue? The wonder is that the writer of that letter has not foresworn motor vehicles forever.

Your Support Wanted.

The thanks of the automobiling community is due to Mr. George F. Chamberlin and his collaborators for the energy and success with which they have worked for the introduction of an amendment to the obnoxious statute prohibiting the transport of automobiles containing gasoline on passenger ferryboats. The bill is now in both houses of Congress, and there appears to be a fair prospect of its passage. No unnecessary chances should be taken, however, and we suggest that every automobile owner among our readers who is interested in the bill's passage write personally to his Senator or Representative urging his support for the amendments now before the House and Senate. The law as it stands was framed before automobiles were used, and it imposes a needless hardship on owners by compelling them to empty the gasoline tanks before their machines can be taken on board. As the proposed amendment provides for the extinguishing of fire, if any, on the machines, and applies only to the transport of gasoline contained in the fuel tanks, there can be no reasonable objection to its passage.

The Automobile in Heavy Service.

M. Georges Forestier's Liverpool address on "Poids Lourds" in France, of which a summary is given on another page, is a frank and judicious statement by one of the best-known of French authorities. That, in spite of the early beginning and persistent experiments in France, so little should actually have been accomplished there in the way of displacing other modes of commercial transport is somewhat noteworthy. It must be borne in mind, however, that a large part of the effort thus spent has been directed towards what is probably the most difficult possible branch of the general problem—the operation of passenger bus lines on schedule. Not only is this a difficult branch, but, except in special instances, it must be called a most unpromising one. Indeed, the amount of attention devoted to it in France is explainable only by the general backwardness of the trolley car in that country, and this condition finds its reductio ad absurdum in a lately-invented electric road vehicle which takes its current by trolley and cable from an overhead wire.

No automobile service can hope to hold its own against the electric tramway, where the traffic is sufficient to warrant the latter's installation. This is true not only in the country, where the motor bus is properly the means for building up a traffic to be subsequently handled by rail, but it holds good in the city as well. Here, however, the aesthetic objections to the tramcar will sometimes turn the scale in favor of its more costly rival. In short, the motor bus is essentially a vehicle for irregular or transitory service, neither so scattered that the capital locked up in the apparatus would make it more costly than horses, nor so dense as to call for systematic handling by trolley lines.

When we come to the local handling of goods, however, especially by manufacturers and dealers and by express companies, the motor wagon competes with the horse pure and simple, and, though certainly much remains to be done, it is already clear that the animal can be beaten on his own ground. We believe, in fact, that the outlook in commercial work is distinctly better in this country than in France, on account of the more systematic manufacturing methods, which will materially reduce the high first cost of which M. Forestier complains, and also render repairs far less expensive.

Meanwhile, we can watch with satisfaction the increasing vogue of motor delivery wagons, whose superior speed and handiness are commending them to the managers of department stores in all the large centers.

The Alcohol Criterium.

The official report on the recent alcohol trials in France has just been published, and the method of comparing the performances of the several machines is interesting. First, the ton-kilometres accomplished per litre of fuel were computed, and ten points per ton-kilometre were allowed. Then a number of points equal to the percentage of alcohol in the fuel was added. Next the time consumed en route, deducting stops not occasioned by derangements of the motor or carbureter, was taken, and the vehicle's speed was credited with five points per kilometre per hour, minus one point per minute for stops on account of motor or carbureter. The sum of the points thus obtained gave the standing of the vehicle. Those machines covering the distance in less than the time limit, however, were credited only with the limit of speed allowed, which was 23¼ kil., or 14 miles per hour. Thirty out of thirty-nine machines thus suffered deductions, the fastest time being 58 kil. or 35 miles per hour. Only nine machines were delayed by trouble with the fuel, over a course nearly 80 miles long, but thirty-one were delayed by other causes.

The announced concerted action of eleven automobile clubs, looking to the placing of road signs along the principal highways in the East, will remove one of the chief existing inconveniences of automobiling. Such sign posts, indicating not only the routes from point to point, but also the character of the roads, are a necessity in a country like ours, and there are few things that the clubs could more fitly concern themselves with.

Hints on Steam Vehicle Management.—V.

By George T. Hanchett.

The average operator of a steam vehicle does not need to be told that the crank of the engine is driven by the connecting rod, which in turn is urged back and forth by a piston working in a cylinder, to either side of which steam is alternately admitted and released. This, however, often constitutes the sum of the knowledge of the non-technical man on such matters.

If the reader will kindly bear in mind, therefore, that the primary object of what follows is to instruct "that other fellow," the writer will, at the risk of being a little elementary, endeavor to explain the action of the simple slide valve, for ninety per cent. of the steam vehicles on the market to-day are equipped with them.

Considering Figure 1, which depicts a simple cylinder and slide valve, we will suppose that steam at high pressure is admitted to the valve chest A, and that the port B is open to the atmosphere. It is evident that if the valve D is moved to the left, steam will be admitted to the right hand side of the piston by the passage m and force it to the left, and that

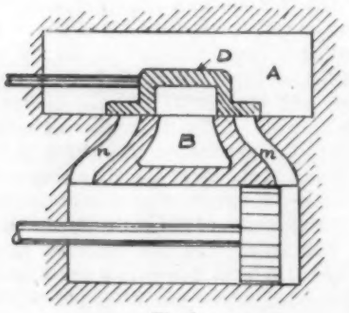


Fig. 1.

whatever vapor is in the space on the left hand side of the piston will escape to the atmosphere by the passages n B.

Conversely, if the valve is pushed to the right, steam will enter on the left side of the piston and propel it to the right, the waste vapors escaping via the passage m B. The impulses of the piston are transmitted to the crank and it is only necessary to time them properly by the valve D to secure continuous and powerful rotation in either direction.

How these impulses shall be timed is what next concerns us. We will assume that the rotation is to be right-handed, as shown in Fig. 2, and for simplicity's sake we will consider the head end of the cylinder only, for the same reasoning applies to the crank end also.

It is plain that the piston should have a strong impulse on its downward stroke right at the start, and therefore at the top position the valve should be opening and admitting steam. In fact, it has been found best to have the valve open a little before the piston reaches the extreme top of the stroke, so as to have the boiler pressure well established in the cylinder by the time the piston is ready to start downward. The amount the valve is open when the piston is at the extreme top of its stroke is called the "lead," and the point where the valve first admits steam is called the point of admission, which therefore occurs a little before the crank has reached the dead centre line.

The next point to determine is how long this admission of steam shall continue. For an impulse of maximum power it should continue throughout the downward stroke, but it is rarely

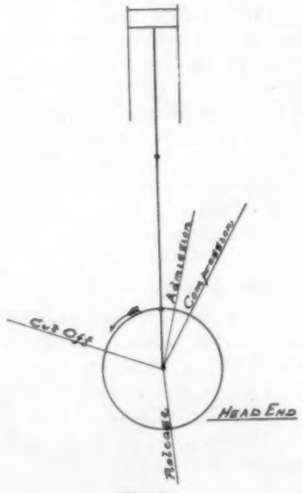


Fig 2.

advisable to do this, because the cylinderful of steam must presently be ejected through the exhaust passage, and it is not economical to throw it away at full boiler pressure. It is better to cut off the steam before the stroke is complete, and to rely on the expansive power of the steam to complete the impulse. This will not give as much power, but it will get a great deal more power out of a given quantity of steam.

This is a little difficult for a beginner to understand. It is customary to shorten the cut-off to one-half or even one-quarter of the stroke, as shown in the figure. The cut-off is one of the most important events in the entire stroke and it is quite essential to take this into consideration in purchasing an engine for automobile work.

For instance, a 5 horse-power engine weighing 70 pounds may be five horse-power, simply because it takes steam clear across the stroke, while a heavier and perhaps more expensive engine of the same power, while apparently a poorer bargain, is really more desirable because by reason of its shorter cut-off it will generate the same power with much less steam.

This may be briefly and practically represented as follows:

We will suppose that an engine taking steam clear across the stroke gives a horse-power for an hour at the expense of 150 pounds of steam, a not at all extravagant figure for such conditions. If we should set the valves of this engine so that it took steam half way across the stroke and depended on expansion for the balance of the stroke, we would use roughly one-half as much steam per stroke, and, if the same speed were maintained, roughly one-half as much steam per hour, or 75 pounds, but out of the 75 pounds not one-half but about three-quarters of a horse-power will be obtained. The advisability of shorter cut-off is therefore apparent. Of two engines of equal power that which works at the shorter cut-off is almost invariably the more economical engine.

Returning to Fig. 2, the next thing to be accomplished after admission and expansion is to free the cylinder of the expanded steam so that the impulse from the other side of the piston will be unopposed. To do this the valve motion shifts the valve so that the steam can escape through the port B, Fig. 1, and the exhaust steam passes freely to the atmosphere as the piston moves upward.

At first thought the beginner would imagine that this event called exhaust should continue throughout the entire upward stroke, but this is not so. There are advantages in shutting off the passage to the atmosphere before all the steam has been ejected, and thus imprisoning the balance of the exhaust steam in the cylinder and compressing it before the upwardly moving piston.

The most important practical reason for this is that the rapid motion of the piston is checked on a soft cushion instead of being abruptly arrested on the crank and wrist pin to the detriment of the bearings. Another reason is that the compression heats the imprisoned steam and raises both its pressure and temperature to more nearly the admission temperature and pressure. This action effects a steam economy in a somewhat complex way, but nevertheless as surely as does the shortening of the cut-off.

The events of the stroke as far as the crank end of the cylinder is concerned are precisely the same with reference to the lower dead point, and it remains for the designer to devise a mechanical motion that will shift the valve back and forth so as to accomplish this desirable steam distribution. How this is commonly done will be reserved for another chapter.

Owners of steam and gasoline vehicles in Baltimore, who have for some months resented the regulation barring their vehicles from the parks, have at last made a test case. A number of steam carriage owners recently drove in a body into Druid Hill Park, and then submitted to arrest, and will fight the case in court.

CLUB NEWS AND VIEWS

Club Directory.

Automobile Club of America, Malcolm W. Ford, Secy., 203 Broadway, New York.

Automobile Club of Baltimore, W. W. Donaldson, Secy., 872 Park Ave., Baltimore.

Automobile Club of Bridgeport, F. W. Bolande, Secy., 49 Cannon St., Bridgeport, Conn.

Automobile Club of Brooklyn, C. Benton Dix, Secy., Hotel Clarendon, Brooklyn, N. Y.

Chicago Automobile Club, H. M. Binckerhoff, Secy., Monadnock Block, Chicago.

Automobile Club of Columbus, C. M. Chittenden, Sec., Broad St., Columbus, O.

Automobile Club of Rochester, Fredk. Sager, Secy., 66 East Ave., Rochester, N. Y.

Buffalo Automobile Club, Ellicott Evans, Secy., Lenox Hotel, Buffalo, N. Y.

Cleveland Automobile Club, L. H. Rogers, Secy., Cleveland, O.

Columbia College Automobile Club Lewis Iselin, Secy., Col. College, New York.

Indiana Automobile Club, August Habich, Secy., Indianapolis.

Long Island Automobile Club, C. W. Spurr, Jr., Secy., 552 State St., Brooklyn

Massachusetts Automobile Club, L. E Knott, Secy., Ashburton Pl., Boston.

New Jersey Automobile Club, Dr. H. Power, Secy., Upper Montclair, N. J.

North Jersey Automobile Club, E. T. Bell, Jr., Secy., Paterson, N. J.

Philadelphia Automobile Club, Frank C Lewin, Secy., Hotel Flanders, Phila., Pa.

Pennsylvania Automobile Club, H. J. Johnson, Secy., 138 N. Broad St., Philadelphia.

Rhode Island Automobile Club, F. A. Fletcher, Secy., P. O. Box 1314, Providence.

San Francisco Automobile Club, B. L. Ryder, Secy., San Francisco, Cal.

Worcester Automobile Club, Harry F Knight, Secy. and Treas., Worcester, Mass.

Buffalo Automobile Club.

The Buffalo Automobile Club opened its new quarters at the Lenox Hotel on Jan. 3. Appropriate addresses were made by the president, Dr. Truman J. Martin, and by John M. Satterfield, Geo. V. Metcalf, Dr. Lee H. Smith and others. After the meeting a supper was served by the hotel management in compliment to the club.

The club rooms are on the ground floor, and include a reception room, reading and meeting room, and a "den." The latter has been decorated in a unique manner, a rough-hewn board fence, with knot holes, being painted around all four walls. Above the fence, on walls and ceiling, are trees and a brilliant sunset sky; and the fence itself is decorated with vivid posters. It is expected that this room will be one of the local attractions of "Pan-American Year."

Automobile Club of Long Island.

Besides co-operating with the Automobile Club of America in establishing road signs, the Automobile Club of Long Island will get up new maps of the Long Island roads. The club hopes to obtain from the Standard Oil Co. a list of all the Long Island dealers in gasoline, and also to make some arrangement by which the dealers on the list will always have at least a small supply of the 76 degree stock on hand. A standard price is another thing hoped for, as out-of-the-way dealers sometimes charge excessive prices.

Following the example of foreign clubs in electing deceased notables to honorary membership, the club's first honorary member was Richard Dudgeon, builder of the steam wagon mentioned in THE AUTOMOBILE of November, 1900. Subsequent elections to honorary membership include Theodore Roosevelt and Timothy Woodruff.

Rhode Island Automobile Club.

The Rhode Island Automobile Club has nearly reached its membership limit, which is fifty, and an increase of the limit to 100 is probable before long. The club will secure temporary quarters pending the proposed fitting up of a permanent location, which will include storage and repair rooms and everything necessary for the convenience of members.

Among the first activities of the club have been the establishing of supply stations and the collecting of information regarding roads and tours. The officers are as follows: President, Dr. Julian A. Chase; vice-president, Henry A. Du Villard; secretary, F. C. Fletcher; treasurer, R. Lincoln Lippitt. By an amendment to the constitution, a second vice-president, assistant secretary and consulting engineer will be added.

Clubs to Erect Guide Posts.

A meeting of delegates and proxies from eleven automobile clubs in the eastern states met on Jan. 10th in the office of A. R. Shattuck, president of the Automobile Club of America, to take action regarding the erection of road signs along the principal highways of the several states. These signs will be uniform in style, and similar to those used in France. They will indicate the distances from point to point, and will describe also the character of the roads to be met with. The posts will be of iron and the signs practically indestructible. The following routes have been chosen for these signs: From New York to New Haven, Springfield, Worcester and Boston; from Boston to Providence and Newport; from Providence to New Haven; from New York to Princeton, Trenton and Philadelphia; from New York to Albany, and also to various points on Long Island. Posts will be erected also from Albany to Worcester, and to Buffalo and Niagara Falls. The work will be begun in the spring, and will be far advanced by autumn.

The following clubs were represented: The Automobile Club of America, Automobile Club of Baltimore, North Jersey Automobile Club, Philadelphia Automobile Club, Long Island Automobile Club, Westchester Automobile Club, Rhode Island Automobile Club, Automobile Club of Bridgeport, Massachusetts Automobile Club, Pennsylvania Automobile Club and Automobile Club of New Jersey.

Washington Automobile Club.

The Washington Automobile Club has been organized in the national capital. C. E. Foster, of 1017 Sixteenth St., N. W., is temporary chairman, and the constitution and by-laws will shortly be drafted. Among the members is Lieut.-Gen. Nelson A. Miles.

An Endurance Test on Long Island.

The Automobile Club of Long Island will hold a 100-mile endurance test on Long Island late in March. The course will be over macadamized roads, with no retracing, and must be completed within 12 hours. Speed limits of 8 and 12 miles an hour are set, and the village authorities will be asked to co-operate in the arrangements. A hill-climbing contest will take place on the grade between Jamaica and Flushing. This is estimated at 20 per cent., and is about a quarter of a mile long. Entry blanks and other information may be obtained of Chas. W. Spurr, secretary, 552 State St., Brooklyn.

Another Cup Proposed.

The Automobile Club of Great Britain wishes to offer an international cup to be competed for by commercial (as opposed to racing) motor carriages, over a portion of the Gordon-Bennett course, and on the same day as the latter race. The main difficulty is to define the difference between touring and racing machines, and this problem is exercising the minds of both the above club and the A. C. F.

The managers of the Pan-American Exhibition have made overtures to the Automobile Club of America looking to an automobile road race as a feature of the exposition.

Heavy Motor Traffic in France.

A noteworthy address on the past and present of heavy motor vehicles in France was given before the Liverpool Self-Propelled Traffic Association, Dec. 3, 1900, by M. Georges Forestier, Inspector-General of Roads and Bridges and a well-known authority on French automobiles.

After pointing out that the term "Poids Lourds," which formed the subject of his address, implied not only heavy motor traffic but a regular schedule service, for passengers or freight, M. Forestier gave an interesting historical résumé of French experiments in construction, up to the first of the annual Poids Lourds trials in 1897.

In passenger vehicles the speaker noted a constant trend towards larger capacity and higher speed, with the accompanying increase in power and weight. This is necessary to reduce operating expenses, but it was pointed out that damage to the roads increased very rapidly with heavy weights and high speeds. The fact that the road resistance may be treble as great on a bad day as on a good one was mentioned as the most serious obstacle to maintaining a schedule service, compelling, as it does, the provision of three times the boiler and engine capacity normally required.

The explosion motor was mentioned as useful for the lighter class of commercial vehicles and buses, but the cost of its fuel, in France at least, together with its lack of flexibility, was regarded as putting it out of the running for heavy schedule service. As regards electric delivery wagons, M. Forestier considered 1,300 lbs. about the best load for these, though that of course would not apply to trucks. It was admitted that the progress made in France, in the passenger branch of heavy motor traffic, had not been wholly satisfactory, as it was impossible to reduce the expense sufficiently and yet maintain a reliable service. In goods traffic the speaker strongly urged that economy over the horse should be sought not in higher speeds, with the attendant high powers, large dead weights and rapid depreciation, but in moderate speeds, say from five to seven miles an hour, and a low maintenance account.

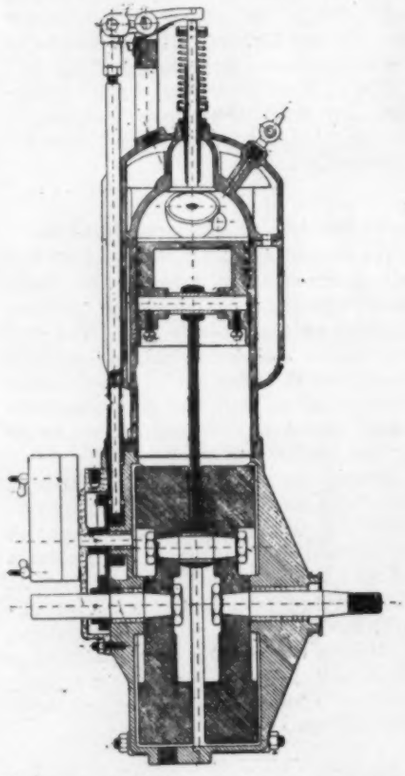
Coming to the actual cost of working, the speaker considered 25 per cent. on the purchase price none too high an estimate for maintenance and repairs, even though he declared the present purchase price to be excessive. The wheels are here an important item, as, being below the springs and not having elastic tires, they are subject to the direct hammering of the roads.

Comparisons were made of the cost of haulage direct by motor wagon with that by railway, with the cartage to and from stations added. Reckoning the total cost of the former at 5 cents per ton-mile, it is found under French conditions to be cheaper than railway transport for distances up to from 11 to 31 miles, according to the character of the freight and the tariffs on the same.

A rough comparison of expense per ton-mile with that of horse traction led to a conclusion slightly in favor of mechanical traction. Reference was made to the importance of large wheels in minimizing damage to the machinery and to the road, as also to insure proper traction on a wet and irregular pavement.

The Buchet Motor.

The latest of the extraordinarily light gasoline motors produced in France is that shown in section in the cut. Its inventor, M. Buchet, began by taking a De Dion motor and substituting a new cylinder head with valves opening from the top directly into the cylinder space instead of into a valve box at one side. A marked gain in power was the result, and



this was attributed to the free passage given to the fresh and exhaust gases by the new arrangement. Whether or not this alone accounted for the results obtained, reported tests of subsequent motors of Buchet's own design, both air and water cooled, bear out his claim of exceptional power. The motor illustrated herewith has a diameter and stroke of 4 inches each, weighs a trifle over 100 lbs., and at 1,600 revs. per minute has developed 6.7 horsepower. This corresponds to the formula

$$H = \frac{D^2 \times L \times R}{15{,}300};$$

and, although the test was doubtless made under the most favorable conditions, still it is a remarkable result for so small a motor with a short stroke.

M. Santos-Dumont, the aeronaut, has ordered a four-cylinder air-cooled motor of this type, which is expected to develop 16 h. p. and will weigh but 200 lbs.

The Gordon-Bennett Cup Race this Year.

Challenges have been received by the Automobile Club de France for the Gordon-Bennett international cup race, from the automobile clubs of Great Britain, Germany and Belgium. The Automobile Club of America will not compete. The course will be from Paris to Bordeaux, via Tours, Poitiers and Augouleme. René de Knyff has been chosen commissary-delegate for France, and the cup will be defended by Charron, Girardot and Levegh. Barring official interference, the race will be run some time in May, in the first week, according to report.

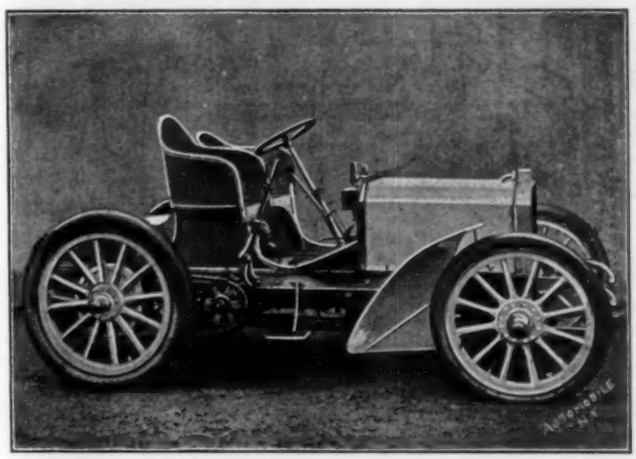
From End to End of Great Britain by Steam Carriage.

Mr. Hubert Egerton, an English motorist, lately accomplished a twelve-day trip from John O'Groat's to Land's End, in a Locomobile stanhope. The trip was made through violent winds and drenching rain the greater part of the journey, but, although the time was necessarily slow, no important stoppages were necessary for repairs. The loss of the balls in one of the rear axle bearings, and the replacing of the burner owing to leakage caused by constant blowing back of the fire in the gale, were nearly the sum of damages sustained.

As it was desired to make the run with as little interruption as possible, it was necessary to send gasoline on ahead to the points of anticipated stoppage, and owing to the weather and the condition of the roads the supply several times ran short between stations, causing trifling delays. Portions of the journey were made at night; and on one occasion Mr. Egerton followed a narrow road cut in the side of a hill above a river, when in the semi-darkness of his lamps he came upon a gully washed across the road by the rains. It was too late to stop, especially as the brake would merely have skidded the wheels in the mud, and the car struck the gap at full speed. The shock nearly caused the machine to turn a backward somersault as it jumped from the gully into the road beyond; but so far as appearances indicated the only damage sustained was that the frame tubes had become slightly buckled. The injury did not prevent the car from completing the journey—a distance of over 600 miles. The loss of the balls above mentioned occurred shortly after, but the axle was put together without them, filled with grease, and run the remaining distance without trouble.

The "Mercedes" Racing Machine and Its Motor.

The superb racing machine shown in the accompanying illustration, which is taken from La France Automobile, is the latest product of the Cannstatt Daimler factory. It is of 35 horsepower, and is reported to weigh, without the body, about 2,100 lbs. This figure, astonishingly low for a machine of such power, is due, we believe, largely to the use of a new alloy of aluminum and magnesium, called "magnalium," which is equal to bronze in strength and toughness, although its weight is even less than that of aluminum.



THE "MERCEDES" RACER.

The motor of this machine, which is also shown, is said to weigh only 200 kilos (440 lbs.), and to be capable of 40 brake h. p. at 900 revs. per minute. The light metal is used in the crank-case and all attached parts, and probably also in the connecting rods, though this is not stated. Two cam shafts are used, one on each side, and both inlet and exhaust valves are cam-actuated—an innovation for the Daimler motor. Regulation is by cutting off the supply of mixture from one, two, or three cylinders, the governor being on the inlet valve cam shaft. The view is taken on the exhaust valve side, and shows the centrifugal circulating pump and also the magneto supplying current for the jump spark igniters. These latter are also of recent adoption by the Daimler company, the hot tube having been used exclusively till within a year or two. A feature of the motor is that the cylinder heads are cast integrally with the cylinders.

This machine, so radically different from the massive Daimler heretofore familiar, draws from La France Automobile the comment: "Germany, therefore, is in the way of making great advances. She has before now produced motors of solidity and power; she now comes forward with vehicles, using similar motors, but of infinitely less weight, and whose aspect approaches perceptibly to those of France."

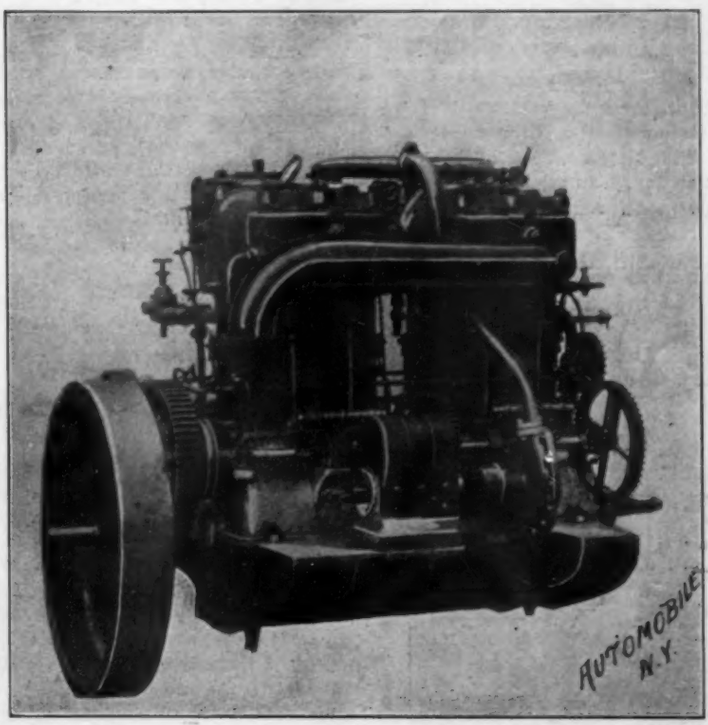
The Leecoll Storage Battery.

This is a new English battery which differs markedly from the ordinary lead cell and is attracting much notice on the other side. Essentially it is a lead-zinc battery, in which the zinc is dissolved from the negative element by discharge and deposited or electro-plated thereon by recharging. The lead elements, instead of being in the form of plates, consist of vertical tubes, each in the centre of a strong cylindrical porous pot which is packed around the tube with lead peroxide. Several of these are used in each cell. The negative elements consist of sheets of fine gauze, of an alloy of copper, on which is deposited a coating of metallic zinc and cadmium. The sheet is passed around one of the outside cups, and is then stitched together from top to bottom. The free ends are then passed around each half of the next cup, stitched again, and so on, so that each cup is wholly surrounded by gauze. The solution is said to be composed of metallic sulphates, those of zinc and cadmium predominating.

A feature of this novel battery is that it is actually benefited by a rate of charging that would ruin a flat-plate lead cell. It is, in fact, necessary for proper deposition of the zinc; and the porous jar is relied upon to preserve the lead element intact during the process. Unless the jar cracks, the active material within cannot become disintegrated or separated from the lead tube.

The working voltage of this battery is between 2.5 and 1.8 volts, about 80 per cent. of the normal discharge being above 2 volts. Slow or rapid discharges do not seem to affect it, and it may be left discharged for weeks without damage, a few charges and discharges at low rates restoring it to its normal condition. Its ampere-hour efficiency is from 70 per cent., if discharged 20 hours after charging, to 100 per cent. if discharged at once. Under the latter condition, indeed, the ampere-hour efficiency may rise to 120 per cent., though when the voltage is taken into account the actual recoupment of energy is found to be about 95 per cent.

The average output of these cells is about 10 watt-hours per pound of battery, equivalent to 3 h. p. for 4½ hours for 1,000 lbs. of cells; but lighter cells have been made, though, of course, at the expense of durability. We are indebted to the Automotor Journal for the above particulars.



THE "MERCEDES" 35-HP. MOTOR.

A new Rochester, N. Y., ordinance limits the speed of automobiles in that city to six and eight miles an hour.

A Club War.

The Moto Club de France, organized a few months ago as a result of a split in the Automobile Club de France, lately changed its name to the Union Automobile de France. A few weeks ago it opened war on the parent organization with a manifesto to the authorities, in which it expressed the hope that dangerous demands for permission to hold automobile races on the highways would be refused. The parent club, regarding this as a purely polemic move, replied by disqualifying all participants in future contests under the Union Club's auspices from races under its own sanction. It is probable that this means the end of racing in the Union Club, as that body is hardly strong enough to conduct its sports independently.

Not Yet Announced.

The Technical and Contest Committees of the Automobile Club of America inform us that the reports published in the press regarding the proposed endurance test to take place in the spring are incorrect and premature. No information has been given out on the subject, as the plans are still before the Board of Governors.

Celebrating The New Century's Dawn.

A series of races for vehicles, bicycles and foot runners was held under the auspices of the New York World just after midnight on Jan. 1, to celebrate the dawn of the twentieth century. The course

J. M. PAIGE,
Winner of the N. Y. World's Dawn-of-the-Century Race.

was from the Harlem office of the World to the Pulitzer Building, and the vehicle race was won by J. M. Paige in a Locomobile. Mr. R. C. Mudge, of the American Bicycle Co., officiated as starter.

Correspondence.

Space will be given on this page to letters concerning the Automobile, its operation or construction, to accounts of tours or runs, routes of travel, good roads, etc. When requested by correspondents their names will not be published, but must always be given in the communication to the Editor.

About Kerosene Steam Carriages.

Editor THE AUTOMOBILE:

Will you kindly inform me if there are any automobiles or locomobiles using kerosene for fuel, and if not, why not? Would it not be more practical, less expensive, and less dangerous than gasoline? I am a machinist and have given the matter very deep study, have made several small burners for stationary boilers in my experiments, and am making a special study of automobile boilers.

F. I. L.

Tarrytown, N. Y., Jan. 24.

(Kerosene is used with some success in heavy steam wagons, in which it is usually volatilized by being passed through a heated coil of tubing before it issues from the burner. A burner of this description, the invention of Henry A. House, was recently illustrated in the "American Machinist," New York; and other burners on the same principle are used in France and England. So far as we know, the only application of kerosene to pleasure vehicles is found in the Serpollet machines in France, which use flash boilers and superheated steam.

Kerosene is certainly less expensive and probably less dangerous than gasoline. It is a much more difficult fuel to manage properly in a burner, and this is the reason inventors thus far have directed their attention to gasoline.—Ed.)

The Ups and Downs of Automobiling.

Editor THE AUTOMOBILE:

I have just read the article "The Cost of Automobiles" in your issue for January. After running a carriage only five months perhaps I am not competent to pass an opinion on the subject, but I can give my experiences, anyway. My vehicle is run by gasoline, and it is heavy and strongly built. I have gone on 100-mile runs, and always reached home with the machine's own power. I frequently go 40 or 50 miles in an afternoon—running at an average speed of 20 miles an hour. A trip of from 16 to 20 miles is not given a thought. Yet I have had troubles—a big lot of them—and spent some money for repairs. Still, I have always managed to get back to the stable without assistance.

Here are some of the things I have encountered: The second week the sparker got out of order, and as a result about a dozen charges of gas exploded at one time, blowing off the muffler. That did not interfere with the motor, and I ran 20 miles making a noise like a tug boat and pouring out smoke like a factory chimney, while the odor was very bad for people in the rear. Another time the sparker again gave out, and I went 10 miles under fair speed, when the only power was from an occasional spark caused by the vibration of the carriage. I have had punctured tires, lost the gasoline tank cover, lost the water valve from the supply tank, broken the brake gear, smashed the differential gear, had the hind axle pull out of the gear when running because the set screw worked away, broken the springs, run into a tree and crooked the front axle, used a limb of a tree to steer with, tied up the leaking rubber tubes with a stocking, used kerosene oil for fuel, run backwards for miles because the front-going gears were out of order, had the batteries give out, locked both fast and slow speeds going up hill, blown out the exhaust valve, gone into a ditch filled with water, run over ploughed land, bunted into electric cars, etc., etc., and the carriage is still ready for use.

The most important difficulties I have met with seemed to me caused by faulty construction and pure carelessness on the part of the workmen who put the carriage together, because every weak point that I have fixed has kept in order since. I have personally made a good many repairs and adjustments, to get an idea of the construction of the carriage, thus saving some cost, but in the five months I have expended $125, which includes $25 for new parts. That is less than the cost of keeping one horse, and I have gone four times as far as a horse could travel. I do not think that it will cost me much for the next year, unless new freaks come up with the machine, for I have had about everything rebuilt by local machinists.

I do not agree with Mr. Bostwick that one can never rely upon running 25 miles and getting back safely, because I have made many longer trips without even stopping once. I seem to have secured the most unlucky machine built by the makers, too, for correspondence with others using the same make shows that I have had more accidents and minor troubles than any of the others.

My theory is that if the makers of automobiles would see that they are put together strongly and skilfully, using the best materials, there would be less trouble in operating the machines. It has been the apparent rule of the manufacturers to have the gear and shafts thrown together any old way, so long as they will carry the owner one trip safely. Then if anything happens the inexperience of the operator is given as the excuse.

I have had keys drop out of gears when running, set screws work loose, and other things happen that would not take place if in building the carriage the makers

had made allowances for quick work on the road. Even ordinary precautions are omitted in many places, so that disaster is simply unavoidable. Such accidents do more to injure the automobiles than can be overcome by thousands of dollars expended in advertising, because the carriages are so scarce every one is an object of criticism, and each visit to the machinist is magnified and exaggerated. The very men who would try to aid the cause of automobilism are really setting it back by their greed for a few dollars extra profit.

I have come to the conclusion that I shall buy the gear and motor of some reliable maker and have the whole affair taken apart and put in first-class shape by a practical machinist. Then I can feel certain that the machinery will be in as good order as it can be put, thus saving a lot of trouble later. A body can be made by a carriage builder much cheaper than it will be furnished by an automobile concern.

I have kept four horses for many years, and enjoy driving them, but if I could have two automobiles that I did not have to work over nearly every time I used them I should not keep a single horse.

There have been as many as ten days at a stretch when I could take my machine out every day by simply oiling and cleaning it, and run from 25 to 100 miles. Such periods are glad memories, but they are nearly offset by other times when fussing and sweating were necessary before the flywheel would keep running around. In all my troubles I have found that if the motor would start up I could keep going, and I have never been stalled away from the stable. Often I have put up the machine at night in apparent good order, and when I tried to start the next day something was wrong. This I ascribe to the contraction and expansion of the metal, for when thoroughly heated valves that leak in the cold morning are tight enough to use when under headway.

I have had experience with both steam and electric carriages, but now pin my faith to gasoline, because so long as there is fuel and four wheels on the carriage the machine will wobble, even though it is noisy and evil-smelling.

Yours very truly,
Salem, Mass., Jan. 15. Robin Damon.

A fire in the Riker works at Elizabethport, N. J., on Dec. 29, did some $30,000 worth of damage to plant and unfinished vehicles. On Jan. 18 the building at 817 14th St., Washington, D. C., was destroyed, causing considerable loss to the Pope Mfg. Co., which had a number of automobiles and bicycles there.

American Electric Carriages in Paris.

Paris, the home and stronghold of the gasoline carriage, is being invaded with considerable success by American electric vehicles. The Electric Vehicle Co. has established a central depot at 54 Avenue Montaigne, where it cares for about fifty private electric carriages at rates lower than horses could be kept for. This includes charging and keeping in repair, and the company does no renting business. Another station will be built near the Arc de Triomphe, and this will accommodate 150 carriages with considerable extra space for battery care. The company reports that the chief demand in Paris is for broughams and victorias driven by men on the box, few owners caring to drive through the crowded streets themselves.

THE DYKE AUTOMOTORETTE.

A Proposed Good Roads Train.

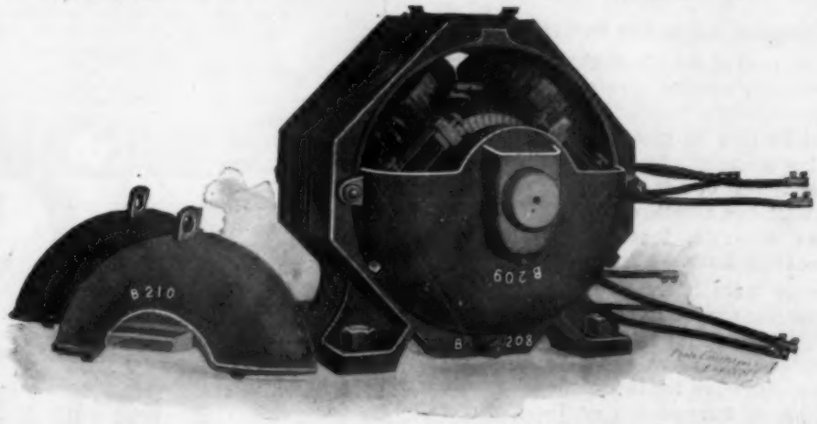
State Senator H. S. Earle, of Detroit, Mich., has a plan for loading a train of cars with every kind of machinery used for making roads or sidepaths, and sending this train from state to state as an object lesson to road officials and the people generally. The intention is to build short sample roads of several kinds at each place where a stop is made, the material, teams and men being furnished by the towns, while the crushers, graders, rollers, etc., are operated by men sent out by the manufacturers of the several machines.

The Dyke Automotorette.

The St. Louis Automobile & Supply Co. are turning out a light gasoline runabout of the style shown in the illustration. It has a tubular running gear similar to that used on most steam carriages, and is rated at 5 h. p. with a weight of 750 lbs. Two forward speeds and one reverse are used, the changes being effected by sliding the gears into and out of mesh; and only one friction clutch is required, the lever of which likewise operates the brake. One lever operates the change gears and reverse. An auxiliary brake is used, with a latch which holds it at whatever tension it is set to. The body opens at top and back, and corrugated water tanks let into the sides of the body take the place of cooling tubes. Current for ignition is supplied by a spark dynamo.

The Lundell Vehicle Motor.

A new motor for vehicles, designed by Robert Lundell, the well-known electrical inventor, is shown in the accompanying illustration. It is of the four-pole type, and is entirely enclosed, so as to be practically dust and water proof. The entire field magnet is made of laminated sheet iron, except that cast iron pole pieces are used to reduce the magnetic lines of force at the pole corners. The armature has a built-up slotted drum, and the radial carbon brushes are carried on rigid rocker arms, so that they cannot jar out of contact under vibration. Removable covers provide for ready access to the commutator. Ample provision is made for overload and hard usage.



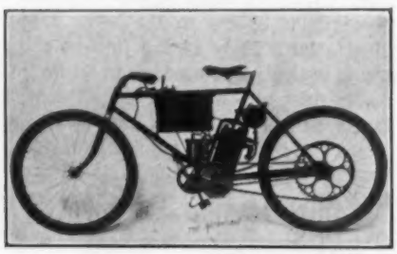
The illustration shows the motor with feet, but lugs or bearings may be substituted to suit the style of suspension and running gear. These motors are made by the Sprague Electric Co., 527-531 W. 34th St., New York.

A Duryea gasoline carriage was recently used in Reading, Pa., to deliver copies of a local paper, during the temporary disablement of the trolley service between that city and Womelsdorf. The weather was very wet, but nevertheless the auto made good time.

The Holley "Autobike."

In this machine is exhibited what appears to be the most practical assimilation of motor and bicycle that has yet appeared in this country. The circular part of the crank case is brazed into the frame so as to become an integral part thereof, the two heads supplying the needed stiffness and completing the structure. The vertical strut is forked, and the motor cylinder, which is separate from the crank case, goes between the forks, as the photograph shows. Pedals for starting are provided, with a coaster brake and one-way clutch, so that the rider can assist the motor in a tight place. The total weight of the machine is given as 74 pounds, and the tank of gasoline—½ gallon—is stated to last for 60 miles of good roads. The motor is said to have pulled a 200-pound man up an 11 per cent. grade at the rate of 16 miles an hour.

The "Autobike" is built by the Holley



THE HOLLEY AUTOBIKE.

Motor Co., Bradford, Pa., and Chas. E. Miller, 97 Reade St., is the New York agent.

Demonstrating the Delivery Wagon.

A method which might well be more generally adopted is being followed by the Daimler Mfg. Co., of Steinway, L. I., in introducing its gasoline delivery wagons. This company affords to possible customers the use of a wagon and driver for from a week to a month, during which the wagons take the longest routes and the heaviest loads. Three New York firms which have lately tested the wagons in this manner are Koch & Co., on W. 125th St.; Stern Bros., 23d St., and Richard Webber, at 3d Ave. and 120th St. A usual morning's run for the wagon is from New York to Mamaroneck or Tarrytown and back.

Electric Vehicles a Specialty.

The Herald Square Automobile Exchange, which will occupy the building at 147-151 W. 35th St., New York, will devote particular attention to privately-owned electric vehicles, of reclaiming exhausted batteries and those damaged by excessive currents. The first floor will be used as a manufacturers' exchange and showroom, and the upper floors, served by an elevator, will be utilized for storage and charging.

The Crest Automobile.

The Crest Manufacturing Co., Cambridgeport, Mass., suggests the design of vehicle shown in the accompanying cut as one of many to which the Crest motor is adapted. The design in question is a copy of one of the French voiturettes. The Crest Mfg. Co. addresses itself especially to small bicycle dealers and repair men, to whom it furnishes drawings with its motors, from which light automobiles may be built.

THE CREST AUTOMOBILE.

Business News.

H. B. Hart, 828 Arch St., Philadelphia, has taken the agency for the "New Home" steam wagon, manufactured by Grout Bros., Orange, Mass.

The Automobile Co. of New Orleans, whose office is at 143 Baronne St., of that city, has started a repository at 429 Baronne St., with facilities for care, storage and selling.

The Sprague Electric Co. has opened a new branch office in Baltimore, in the Guardian Trust Building, at the corner of Calvert and German Sts. The manager will be W. H. A. Davidson, who has sold the Lundell motors ever since they have been on the market.

Mr. A. Ward Chamberlin, late of Owen & Chamberlin, New York, agents for the Winton Motor Carriage, is now New York agent for the "Gasmobile," built by the Automobile Co. of America. Mr. Chamberlin is a brother of George F. Chamberlin, ex-President of the Automobile Club of America.

It is reported that the Baldwin Automobile Mfg. Co., of Connellsville, Pa., has made an assignment. The company is capitalized at $250,000, and heavy outlays for improvements are said to have been the cause of the failure. The company claims to have many orders booked, and sixty per cent. of the creditors are said to be willing to grant an extension.

By reason of its improved facilities for manufacturing, the Duryea Power Co., Reading, Pa., will reduce the price of its driving phaeton from $1,500 to $1,250, while still bettering the quality of the vehicle. These machines are now being equipped with a box behind the dash, which serves both as a baggage receptacle and as a children's seat when desired. This will be an added recommendation to the vehicle for touring purposes.

Chas. E. Miller, agent for automobile parts, fittings and sundries, has taken the entire top floor at 97-101 Reade St., New York, and will have an extensive sample room in the Reade St. entrance. Mr. Miller handles a great variety of specialties, which include steam gauges and fittings, gasoline motors, automobile boilers, folding water buckets, carbureters, mufflers, special tools, and motocycle parts in variety. He has just secured the local agency of the Holley motor bicycle, shown elsewhere in this issue.

Patents.

List of Automobile patents granted during month of January.

664,373—Combined condenser and dashboard for automobiles. Issued to L. F. N. Baldwin.
664,729—Steering axle for automobiles. Issued to J. B. Decker.
664,457—Carbureter. Issued to J. F. Bennett.
664,800—Motor vehicle gearing. Issued to G. P. Dorris.
664,478—Motor vehicle. Issued to F. B. Hopewell.
664,853—Motor vehicle. Issued to R. Hagen.
665,270—Motor vehicle. Issued to W. N. Rumely.
665,093—Vehicle steering gear. Issued to A. Herschmann.
665,496—Carbureter. Issued to W. O. Worth.
665,715—Vehicle wheel tire. Issued to C. F. Allen.
665,700—Vehicle wheel tire. Issued to A. L. Stevens.
665,497—Motor vehicle. Issued to W. O. Worth.